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March 14, 2007 (1:23pm)

Docket: AM-8304

Remarks

Claims 1-9, and 12-16, 19, and 30-32 remain in the application.

Please note that claims 16, 17, and 19 were amended in the response of March 6, 2006 to have new dependencies although their status was incorrectly labeled as original at that time. The current listing of the claims includes the previously amended dependencies.

The Examiner has rejected claims 1, 2, 3, 5, and 6 under 35 U.S.C. §102(b) as being anticipated by Moslehi (US Patent 4,891,499, hereafter Moslehi '499) or Moslehi (US Patent 4,956,538, hereafter Moslehi '538).

Claim 1 has been amended to require that the thermal monitoring is pyrometric monitoring, that is, using a pyrometer. In contrast, both Moslehi '499 and Moslehi '538 place one or more photodetectors at the bottom, device side of the wafer to measure the amount of light transmitted through the wafer from a laser positioned above the wafer. Moslehi '499 additionally discloses two photodetectors positioned on the device side of the wafer receiving light from respective beams on the back side of the wafer. Moslehi '538 additionally discloses pyrometers positioned on the back side of the wafer. No art has been cited for the use of pyrometry to the device side of a backside-heated wafer in a thermal processing chamber.

Claim 3 has been amended to require that the bottom of the wafer is supported by a fixture having a annular shelf, as supported at page 7, line 16 and page 10, line 25 of the filed application. New dependent claim 30 requires the shelf to be sloping. Moslehi '538 describes at col. 8, ll. 41-43 his support structure only as unillustrated pins. Moslehi '499, as briefly described at col. 6, ll. 57-61 and shown in FIGS. 2 and 3, supports the wafer 26 on quartz pins 50 attached to the heated quartz ring 46 positioned outside of the wafer. Three narrow quartz pins 50 are illustrated but not described in any detail. The claimed annular sloping shelf structurally differs from three isolated pins and provides more uniform thermal contact and more assured mechanical support.

The Examiner has rejected claims 1-9, 12-15, and 17-19 under 35 U.S.C. §103(a) as

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being obvious over Ballance et al. (US Patent 6,090,210, hereafter Ballance) in view of Moslehi '499 or Moslehi '538). This rejection over amended claims 1 and 3 is traversed.

Claim 1 now requires pyrometric monitoring of the bottom, device side of the wafer. Ballance admittedly describes bottom, backside pyrometric monitoring of a conventionally oriented wafer with front side heating. He does not disclose front side pyrometric monitoring. Moslehi '538 is the only reference combining backside heating with pyrometry and he clearly describes and illustrates in FIGS. 2 and 3 one or two pyrometers 26, 28 monitoring the top, back side of the wafer 64. The only bottom front side monitoring is done by the IR detector 59 measuring the radiation transmitted through the wafer 64 by the laser 48, a configuration also described by Moslehi '499.

Claim 3 now requires the support to be an annular shelf and new claim 31 requires the shelf to slope. As argued above, Moslehi '499 or '538 at best discloses plural support pins protruding inwardly from a ring outside of the wafer. Ballance does not supply the deficiency of such a support on the device side being an annular shelf. New claim 30 depending from claim 3 further require the thermal monitoring to be pyrometry and thus should be additionally allowable as argued for claim 1.

Claim 12 has been amended to recite that the holding means includes an annular ring. The claim language has now been simplified to more directly recite the inverted orientation of the wafer. Dependent claims 17 and 18 have been canceled as unnecessary. Only Moslehi '499 describes the support fixture for an inverted wafer and his pins differ from the recited ring and contribute to thermal non-uniformity, which may be avoided with the invention.

Claim 19 has been amended to more specifically recite pyrometers having view ports through the reflector.

The Examiner has rejected claim 16 under 35 U.S.C. §103(a) as being obvious over Ballance in view of Moslehi '499 or Moslehi '538 and further in view of McNeilly et al. (US Patent 4,047,496, hereafter McNeilly) or Samoilov et al. (US Patent 6,455,814, hereafter Samoilov). None of the art combines processing of a wafer in an inverted position with backside heating and front side pyrometry. Such combination allows the processing of the inverted wafer

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in an otherwise conventional commercialized RTP chamber with the major modifications being limited to the wafer support structures.

Samoilov's chamber structure disadvantageously requires heating of the wafer on the side on which it is supported, thus introducing non-uniformities in the heating pattern introduced by the support arms. Such complexities demonstrate that inverting a wafer or an RTP chamber in order to combine references introduce difficulties inconsistent with the law's requirement that the combination requires a suggestion of the advantages for the combination. Only the inventor has disclosed a workable version of the claimed combination.

In view of the above amendments and remarks, reconsideration and allowance of all claims are respectfully requested. If the Examiner believes that a telephone interview would be helpful, he is invited to contact the undersigned attorney at the listed telephone number, which is on California time.

Date: 15 March 2007

Correspondence Address

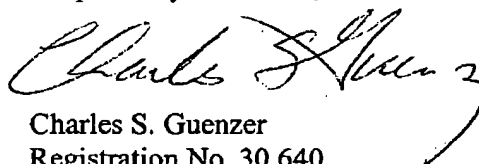
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Respectfully submitted,



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